

1

# OLED ARRAY SUBSTRATE HAVING BLACK MATRIX, MANUFACTURING METHOD AND DISPLAY DEVICE THEREOF

## TECHNICAL FIELD

The disclosure relates to an OLED array substrate and a manufacturing method thereof, and a display device comprises the OLED array substrate.

## BACKGROUND

Organic electroluminescence displays, also known as organic light-emitting diode (OLED) display devices, with advantages such as low energy consumption, high luminance, fast response time, wide viewing angle and light weight, have been broadly applied in devices such as mobile communication terminals, personal digital assistants (PDAs) and palmtop computers. OLED display devices are classified into passive matrix type and active matrix type, wherein active matrix type OLED display devices utilize thin film transistors (TFTs) to drive OLEDs.

However, when an active matrix OLED display device displays images, the light emitted by the OLED tends to be incident on TFTs, which would influence the photocurrent of the TFTs, thereby causing current deviation in the OLED driven by the TFTs, and impacting the display effect.

## SUMMARY

Embodiments of the present invention provide an OLED array substrate and a manufacturing method thereof, and a display device comprises the OLED array substrate.

According to a first aspect of the present invention, there is provided an OLED array substrate comprising: a plurality of thin film transistors disposed on a base substrate, a black matrix disposed over each of thin film transistors, the black matrix being provided with a via therein; a first electrode, a luminescent layer, and a second electrode disposed over the black matrix from bottom to top. The first electrode is connected with the thin film transistor through the via, and the first electrodes disposed over adjacent thin film transistors are separated from each other by a barrier.

In one example, a first protection layer is disposed between the first electrode and the thin film transistor, the black matrix and the first protection layer are disposed in same layer.

In one example, the luminescent layer is color luminescent layer.

In one example, the luminescent layer is white luminescent layer, a color filter layer is disposed between the first protection layer and the thin film transistor; and the via penetrates both the black matrix and the color filter layer.

In one example, the luminescent layer is white luminescent layer, a color filter layer and a first protection layer are disposed from bottom to top between the first electrode and the thin film transistor, the black matrix and the color filter layer are disposed in same layer; and the via penetrates both the first protection layer and the black matrix.

In one example, a second protection layer is further disposed between the color filter layer and the thin film transistor; and the via further penetrates the second protection layer.

In one example, the first electrode is anode, and the second electrode is cathode; or the first electrode is cathode, and the second electrode is anode.

2

In one example, the luminescent layers disposed over adjacent thin film transistors are separated from each other by the barrier.

In one example, the barrier is disposed in a projection area of the black matrix onto the base substrate.

According to a second aspect of the present invention, there is provided a method of manufacturing an OLED array substrate, comprising: forming a pattern comprising a plurality of thin film transistors on a base substrate; forming a pattern comprising a black matrix, the black matrix being located over each thin film transistor and provided with a via; and forming a pattern on the black matrix, the pattern comprising a first electrode, a barrier, a luminescent layer, and a second electrode, wherein the first electrode is connected with the thin film transistor through the via, and the first electrodes disposed over adjacent thin film transistors are separated from each other by the barrier.

In one example, the step of forming the pattern comprising the black matrix comprises: forming a pattern comprising both a first protection layer and a black matrix, wherein the first protection layer and a black matrix are disposed in same layer.

In one example, the luminescent layer is a color luminescent layer.

In one example, the luminescent layer is white luminescent layer, before the step of forming the pattern comprising both the first protection layer and the black matrix, the method further comprises: forming a pattern comprising a color filter layer; wherein the via penetrates both the black matrix and the color filter layer.

In one example, the step of forming the pattern comprising the black matrix comprises: forming a pattern comprising both a color filter layer and a black matrix, wherein the color filter layer and the black matrix are disposed in same layer. After the step of forming the pattern comprising both the color filter layer and the black matrix, the method further comprises: forming a pattern comprising a first protection layer; wherein the via penetrates both the first protection layer and the black matrix.

In one example, after the step of forming the pattern comprising the plurality of thin film transistors on the base substrate, the method further comprises: forming a pattern comprising a second protection layer; wherein the via further penetrates the second protection layer.

In one example, wherein the first electrode is anode, and the second electrode is cathode; or the first electrode is cathode, and the second electrode is anode.

In one example, the luminescent layers formed over adjacent thin film transistors are separated from each other by the barrier.

In one example, the barrier is disposed in a projection area of the black matrix onto the base substrate.

According to a third aspect of the present invention, there is provided a display device comprising the above-mentioned OLED array substrate.

## BRIEF DESCRIPTION OF THE DRAWINGS

In order to explain the technical solution of embodiments of the present invention more clearly, accompanying drawings of the embodiments will be introduced briefly below. Obviously, the accompanying drawings in the following description only relate to some embodiments of the present invention rather than limiting the present invention.

FIG. 1 is a schematically structural diagram of an OLED array substrate provided in embodiment 1 of the present invention;